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1995 - 2011 LABOUR FORCE PROJECTIONS AUSTRALIA

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LABOUR FORCE PROJECTIONS, AUSTRALIA 1995-2011

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Note: This publication contains two sets of labour force projections, corresponding to population projections Series A and Series D published in *Projections of the Populations of Australia, States and Territories, 1993 to 2041* (3222.0).

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INQUIRIES

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LABOUR FORCE PROJECTIONS

Introduction

Projections of the civilian labour force in Australia are given in this publication. The projections are based on a study of labour force participation rate estimates up to August 1993 together with the Series A and D population projections published in *Projections of the Populations of Australia, States and Territories 1993 to 2041* (3222.0). The projections illustrate the size and composition of the future Australian civilian labour force which would be achieved if the underlying assumptions were realised. These assumptions are described in the Technical Notes (page 15). As such they are neither predictions nor forecasts of the labour force.

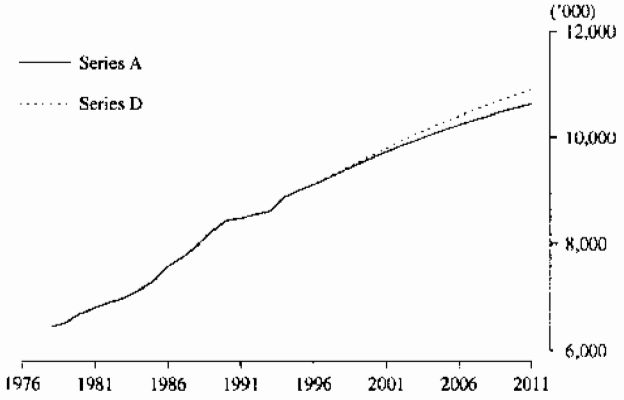
Labour force

The civilian labour force (those persons aged 15 and over, either in civilian employment or unemployed) is projected to grow from 8.3 million persons in 1993 to between 10.6 million (Series A) and 10.9 million (Series D) persons in the year 2011.

This publication presents results based on the "low" series (Series A) and the "high" series (Series D) population projections which are used as the basis for projecting the labour force. The following discussion presents the results arising from the use of the Series A population projections, the assumptions for which most closely reflect current demographic conditions.

A labour force numbering 10.6 million in 2011 equates to an average growth rate of 1.2 per cent per annum during the period 1993 to 2011. The annual growth rate of the labour force is projected to decline gradually, from 1.3 per cent in the year to June 1996 to 0.6 per cent in the year to June 2011.

FIGURE 1. CIVILIAN LABOUR FORCE ESTIMATES AND PROJECTIONS PERSONS

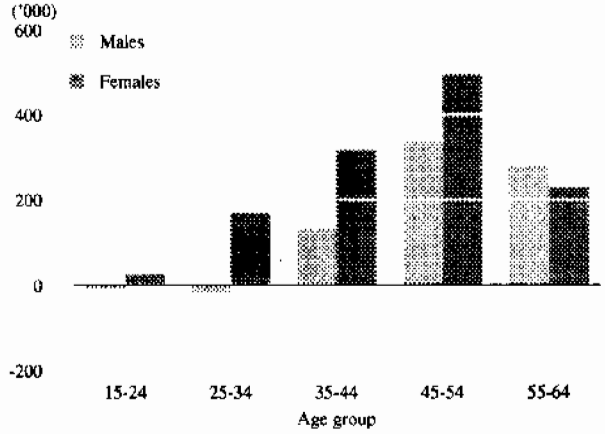


Age projections

The projections of participation rates, when applied to the Series A population projections, show a changing age structure of the labour force.

- The labour force included 1.87 million persons in the 15-24 age group in 1993. By 2011, it has been projected that there will only be a small rise in the labour force for this group to 1.89 million. Persons aged 15-24 would therefore represent a declining proportion of the total labour force, falling from 21.8 per cent in 1993 to 17.8 per cent in 2011.
- For both males and females, the major gains in labour force numbers are projected to occur for the 45-54 age group. Between 1993 and 2011, the male labour force in this age group is projected to rise by 338,600, an increase of 36 per cent, and for females the projected gain is 494,900 or 75 per cent.
- The projected growth in the numbers of persons aged 55-64 in the labour force is relatively high. In 1993 this group was estimated to be 641,900 and the projections suggest that by 2011 it could reach 1,149,400, an increase of 79 per cent. The number of females in the labour force in this age group is projected to more than double during this period, while the number of males is projected to increase by 62 per cent.
- Persons in the older age groups are thus projected to contribute a larger share of the labour force. The 45-54 age group is projected to grow from 18.5 per cent in 1993 to 22.9 per cent in 2011, while the 55-64 age group is projected to grow from 7.4 per cent of the labour force to 10.8 per cent over the same period.

FIGURE 2. PROJECTED GAINS IN THE LABOUR FORCE 1993 TO 2011 - PERSONS SERIES A



Males and females in the labour force

Based on the A series population projections, the labour force projections show:

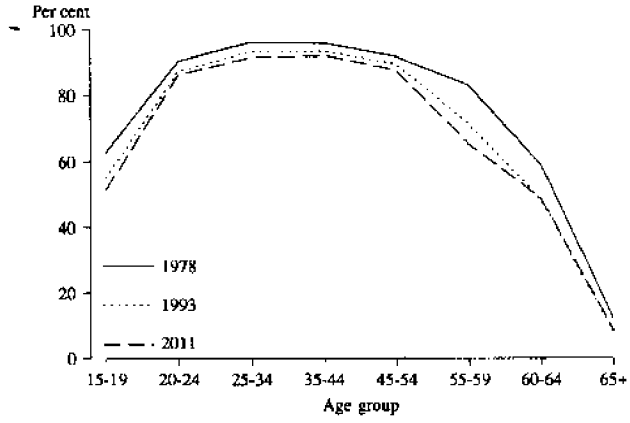
- The number of males in the labour force is projected to be 5.8 million in 2011 with an average annual growth rate of 0.8 per cent between 1993 and 2011.
- For females, the projected labour force in 2011 is 4.9 million, representing an average annual rate of growth of 1.7 per cent over the previous eighteen years.
- These results would shift the male/female ratio of the labour force from 58 per cent/42 per cent in 1993 to 54 per cent/46 per cent in 2011.

Participation rates

The male participation rates are projected to fall for all age groups although there are some marked differences between the age groups. For all males, the participation rate is projected to fall from 73.7 per cent in 1993 to 69.2 per cent in 2011. For those aged 15-19, the participation rate is projected to fall from 55.1 per cent in 1993 to 51.5 per cent in 2011; for the 45-54 age group, it is projected to fall from 89.0 per cent in 1993 to 87.9 per cent in 2011; and for the 55-59 age group, from 71.7 per cent in 1993 to 65.7 per cent in 2011.

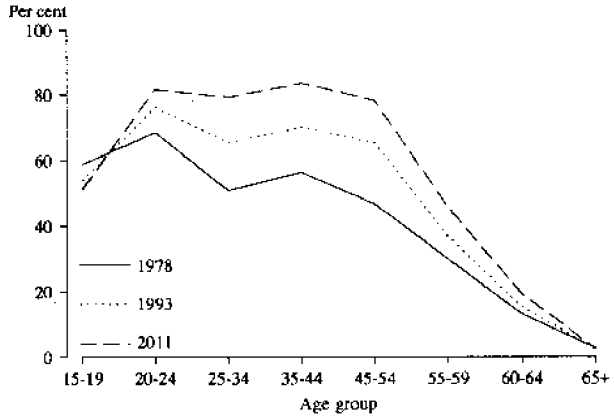
Figure 3 below shows the projected differences in rates, illustrating the greatly reduced participation by males aged 55-59 years since 1978.

FIGURE 3. PARTICIPATION RATES
MALES



For females, the rates are projected to increase for all age groups except those aged 15-19 and those aged 65 and over. The participation rate for females aged 25-34 years is projected to increase from 65.6 per cent in 1993 to 79.3 per cent in 2011, and for females aged 35-44 it is projected to increase from 70.4 per cent to 83.8 per cent over the same period. Historically, female participation rates have diplayed the characteristic "M" shape, arising from the lower participation of females aged 25-34 years. The net effect of the projections is to reduce markedly this life-cycle feature. The significantly higher participation by females aged 20 to 59 years is apparent in the comparison of actual rates for 1978 and 1993 and the projected rates for 2011, shown in Figure 4.

FIGURE 4. PARTICIPATION RATES
FEMALES



The overall projected participation rate for males is influenced by the changing age structure of the population projections as well as the declining participation rates for each age group (see Figure 5.). The decline in the participation rate for Series A from 73.7 per cent in 1993 to 69.2 per cent in 2011 reflects the substantially higher proportion of the male population aged 65 and over, together with a marked fall in the proportion of males aged 25-44 years. This latter group has the highest participation rate, projected to remain at more than 90 per cent.

For females, there are similar changes to the age structure of Series A of the population projections but participation rates for each age group are generally projected to increase. The net effect of these changes is for the overall projected participation rate to increase from 51.8 per cent in 1993 to 56.8 per cent in 2011. For Series A projections, the participation rate for persons would increase from 62.6 per cent in 1993 to a peak of 64.1 per cent in 2001, before decreasing to 62.9 per cent in 2011.

FIGURE 5. PARTICIPATION RATES
ESTIMATES AND PROJECTIONS
SERIES A

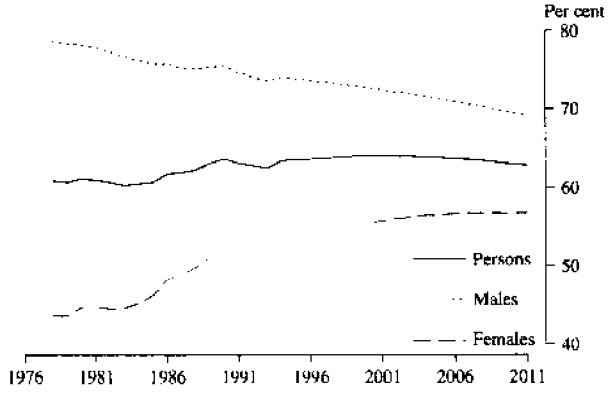


TABLE 1. LABOUR FORCE BY SEX, AUSTRALIA — SERIES A AND D ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011 ('000)

ANNUAL AVERAGES

Year	*Males*	*Females*	*Persons*
1978	4,103.9	2,339.5	6,443.4
1979	4,146.5	2,372.6	6,519.0
1980	4,211.2	2,481.7	6,692.9
1981	4,278.9	2,531.5	6,810.3
1982	4,332.8	2,577.0	6,909.8
1983	4,371.6	2,625.8	6,997.4
1984	4,426.9	2,708.1	7,135.1
1985	4,482.3	2,818.0	7,300.3
1986	4,586.1	3,001.6	7,587.6
1987	4,652.0	3,105.6	7,757.6
1988	4,744.5	3,230.0	7,974.5
1989	4,842.5	3,385.4	8,227.9
1990	4,932.5	3,511.1	8,443.7
1991	4,942.2	3,547.9	8,490.1
1992	4,971.9	3,590.2	8,562.0
1993	4,994.6	3,624.2	8,618.8

PROJECTIONS

	Series A			*Series D*		
June	*Males*	*Females*	*Persons*	*Males*	*Females*	*Persons*
1995	5,165.5	3,835.6	9,001.0	5,167.0	3,836.8	9,003.8
1996	5,209.6	3,912.2	9,121.8	5,214.2	3,916.0	9,130.2
1997	5,255.3	3,990.2	9,245.4	5,264.4	3,997.9	9,262.3
1998	5,303.3	4,070.2	9,373.5	5,318.6	4,083.3	9,401.8
1999	5,349.4	4,147.5	9,496.9	5,372.3	4,167.4	9,539.7
2000	5,395.8	4,224.2	9,620.0	5,427.4	4,251.9	9,679.3
2001	5,439.3	4,296.8	9,736.1	5,480.2	4,333.0	9,813.2
2002	5,478.0	4,363.7	9,841.7	5,528.3	4,408.7	9,937.0
2003	5,516.9	4,431.0	9,948.0	5,576.8	4,485.1	10,061.9
2004	5,552.8	4,494.7	10,047.5	5,622.4	4,558.0	10,180.4
2005	5,589.3	4,558.3	10,147.6	5,668.7	4,631.1	10,299.8
2006	5,622.3	4,616.3	10,238.6	5,711.6	4,698.8	10,410.4
2007	5,651.0	4,670.2	10,321.2	5,750.5	4,762.7	10,513.1
2008	5,683.0	4,725.0	10,408.0	5,792.7	4,827.6	10,620.3
2009	5,710.5	4,776.2	10,486.7	5,830.7	4,889.1	10,719.8
2010	5,738.0	4,825.8	10,563.8	5,868.7	4,949.3	10,818.0
2011	5,761.2	4,870.7	10,631.9	5,902.7	5,005.0	10,907.7

TABLE 2. LABOUR FORCE BY AGE — MALES SERIES A
ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
('000)

	Age Group								
Year	*15-19*	*20-24*	*25-34*	*35-44*	*45-54*	*55-59*	*60-64*	*65 and over*	*Total*
				ANNUAL AVERAGES					
1978	413.2	539.8	1,095.1	807.7	723.2	287.8	167.5	69.7	4,103.9
1979	422.6	555.6	1,115.6	826.9	712.7	293.6	152.4	66.9	4,146.5
1980	428.6	572.7	1,138.0	851.8	705.2	301.9	146.2	66.8	4,211.2
1981	429.2	589.0	1,163.1	884.7	698.9	300.0	147.9	65.9	4,278.9
1982	421.8	596.1	1,178.1	932.4	698.4	298.1	146.9	60.9	4,332.8
1983	401.8	603.2	1,192.2	976.2	700.4	295.0	143.2	59.7	4,371.6
1984	398.6	600.3	1,196.1	1,014.6	709.7	298.5	147.7	61.4	4,426.9
1985	402.3	601.8	1,203.6	1,051.1	713.6	296.7	151.0	62.2	4,482.3
1986	420.9	600.1	1,229.2	1,088.8	729.6	295.9	159.6	62.0	4,586.1
1987	423.9	593.5	1,254.8	1,121.9	741.3	288.0	163.1	65.5	4,652.0
1988	427.8	596.4	1,278.7	1,160.6	758.2	278.3	174.4	70.1	4,744.5
1989	441.9	595.9	1,301.1	1,179.5	791.5	279.1	181.7	71.8	4,842.5
1990	435.3	605.9	1,311.9	1,213.2	830.4	275.5	186.0	74.3	4,932.5
1991	394.8	611.3	1,316.5	1,229.4	861.1	271.4	182.8	74.9	4,942.2
1992	377.7	625.5	1,307.2	1,233.1	896.3	274.0	178.9	79.3	4,971.9
1993	364.3	629.1	1,301.1	1,241.3	936.1	275.3	173.1	74.3	4,994.6
				PROJECTIONS					
1995	368.7	647.5	1,321.3	1,276.8	1,005.4	292.0	170.0	83.8	5,165.5
1996	367.6	629.7	1,323.3	1,293.5	1,039.6	299.7	170.4	85.7	5,209.6
1997	367.1	611.6	1,329.5	1,309.9	1,068.6	307.4	173.9	87.2	5,255.3
1998	368.8	599.1	1,331.6	1,324.2	1,099.2	312.8	179.0	88.5	5,303.3
1999	370.1	590.7	1,331.6	1,337.0	1,121.5	323.6	185.0	89.9	5,349.4
2000	372.0	585.4	1,335.1	1,342.6	1,141.5	336.7	191.4	91.2	5,395.8
2001	371.6	587.0	1,336.2	1,342.2	1,160.7	350.9	198.0	92.8	5,439.3
2002	370.7	589.5	1,336.8	1,342.0	1,167.3	372.7	204.6	94.4	5,478.0
2003	368.7	595.2	1,334.7	1,341.7	1,176.9	393.9	209.6	96.2	5,516.9
2004	367.8	600.1	1,329.6	1,343.7	1,187.9	407.5	218.3	98.1	5,552.8
2005	367.9	605.8	1,318.9	1,345.4	1,205.2	417.6	228.5	100.0	5,589.3
2006	368.5	608.0	1,303.9	1,351.0	1,222.9	426.3	239.6	102.2	5,622.3
2007	368.1	609.3	1,289.0	1,360.1	1,240.2	424.0	255.9	104.5	5,651.0
2008	370.2	608.9	1,282.8	1,364.6	1,254.9	423.1	271.9	106.6	5,683.0
2009	370.9	610.1	1,279.8	1,366.3	1,268.1	423.1	282.7	109.6	5,710.5
2010	370.3	613.2	1,280.8	1,370.7	1,274.1	425.0	291.1	112.7	5,738.0
2011	369.3	616.8	1,285.1	1,372.8	1,274.7	427.4	298.7	116.4	5,761.2

TABLE 3. LABOUR FORCE BY AGE — FEMALES SERIES A
ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
('000)

	Age Group								
Year	*15-19*	*20-24*	*25-34*	*35-44*	*45-54*	*55-59*	*60-64*	*65 and over*	*Total*
				ANNUAL AVERAGES					
1978	375.0	409.5	576.7	457.5	352.6	106.3	40.0	21.9	2,339.5
1979	375.2	422.7	588.8	475.8	350.8	101.2	38.8	19.1	2,372.6
1980	392.5	443.3	619.8	502.0	352.5	107.1	41.3	23.1	2,481.7
1981	384.6	451.9	643.4	522.3	361.0	109.6	37.2	21.4	2,531.5
1982	376.5	464.0	656.0	556.3	363.3	104.1	36.5	20.5	2,577.0
1983	374.2	475.9	671.2	579.5	357.4	107.1	40.9	19.6	2,625.8
1984	371.7	483.1	691.7	611.1	379.2	109.1	41.9	20.4	2,708.1
1985	377.6	489.4	735.1	661.5	385.5	105.5	43.2	20.2	2,818.0
1986	398.9	493.2	787.4	723.3	417.8	111.5	46.4	23.1	3,001.6
1987	401.3	495.8	823.0	760.8	435.5	115.1	48.2	25.9	3,105.6
1988	402.3	496.9	852.8	819.3	464.9	115.5	51.1	27.2	3,230.0
1989	412.6	511.7	894.7	867.3	502.8	118.0	54.8	23.4	3,385.4
1990	404.3	525.0	918.3	918.4	537.4	121.9	59.4	26.3	3,511.1
1991	369.9	532.1	926.6	928.7	577.1	129.2	56.1	28.1	3,547.9
1992	359.2	536.5	928.0	937.7	618.6	131.6	52.3	26.1	3,590.2
1993	341.2	539.9	922.9	938.4	660.8	138.7	54.9	27.4	3,624.2
				PROJECTIONS					
1995	344.7	555.3	975.4	1,011.3	720.1	145.0	54.5	29.3	3,835.6
1996	343.6	541.2	990.5	1,039.1	761.0	151.8	55.2	29.9	3,912.2
1997	344.1	527.1	1,007.6	1,066.8	798.7	158.5	57.1	30.3	3,990.2
1998	345.8	518.5	1,020.3	1,092.0	838.7	164.6	59.6	30.7	4,070.2
1999	347.6	513.3	1,031.4	1,114.8	873.1	174.0	62.3	31.0	4,147.5
2000	350.7	510.0	1,043.7	1,132.5	905.0	186.0	64.8	31.4	4,224.2
2001	350.9	513.1	1,053.9	1,145.4	935.7	198.2	67.8	31.8	4,296.8
2002	350.1	518.0	1,063.1	1,157.3	956.8	215.5	70.7	32.3	4,363.7
2003	349.0	524.5	1,070.5	1,167.7	980.3	233.0	73.3	32.7	4,431.0
2004	348.3	530.9	1,074.1	1,180.0	1,003.8	246.8	77.4	33.2	4,494.7
2005	347.9	539.3	1,072.9	1,192.3	1,031.1	258.5	82.7	33.7	4,558.3
2006	348.6	543.2	1,067.6	1,206.1	1,057.8	270.7	88.0	34.3	4,616.3
2007	348.5	545.8	1,063.7	1,221.7	1,084.3	275.8	95.5	34.9	4,670.2
2008	350.4	547.6	1,066.2	1,232.1	1,108.0	282.2	103.0	35.5	4,725.0
2009	351.1	550.1	1,071.5	1,239.9	1,129.0	289.1	109.0	36.3	4,776.2
2010	350.8	552.9	1,080.2	1,248.8	1,144.8	297.0	114.1	37.2	4,825.8
2011	350.0	557.6	1,090.6	1,255.4	1,155.7	304.0	119.3	38.2	4,870.7

TABLE 4. LABOUR FORCE BY AGE — PERSONS SERIES A
ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
('000)

	Age Group								
Year	*15-19*	*20-24*	*25-34*	*35-44*	*45-54*	*55-59*	*60-64*	*65 and over*	*Total*
				ANNUAL AVERAGES					
1978	788.3	949.3	1,671.8	1,265.2	1,075.8	394.1	207.4	91.6	6,443.4
1979	797.9	978.3	1,704.4	1,302.7	1,063.5	394.9	191.2	86.1	6,519.0
1980	821.2	1,015.9	1,757.9	1,353.8	1,057.8	408.9	187.5	89.9	6,692.9
1981	813.8	1,040.9	1,806.5	1,407.0	1,060.0	409.7	185.1	87.3	6,810.3
1982	798.3	1,060.1	1,834.1	1,488.7	1,061.7	402.1	183.4	81.5	6,909.8
1983	776.0	1,079.0	1,863.4	1,555.7	1,057.8	402.1	184.1	79.3	6,997.4
1984	770.3	1,083.5	1,887.8	1,625.7	1,088.9	407.6	189.6	81.7	7,135.1
1985	779.9	1,091.2	1,938.7	1,712.6	1,099.1	402.2	194.2	82.4	7,300.3
1986	819.8	1,093.3	2,016.6	1,812.1	1,147.4	407.4	206.0	85.0	7,587.6
1987	825.2	1,089.2	2,077.7	1,882.7	1,176.8	403.1	211.3	91.5	7,757.6
1988	830.1	1,093.4	2,131.5	1,979.9	1,223.1	393.8	225.5	97.3	7,974.5
1989	854.5	1,107.6	2,195.8	2,046.8	1,294.3	397.1	236.4	95.2	8,227.9
1990	839.6	1,131.0	2,230.2	2,131.6	1,367.8	397.5	245.4	100.6	8,443.7
1991	764.7	1,143.4	2,243.1	2,158.1	1,438.2	400.6	238.9	103.0	8,490.1
1992	736.9	1,162.0	2,235.2	2,170.8	1,514.9	405.6	231.2	105.4	8,562.0
1993	705.6	1,169.0	2,223.9	2,179.7	1,596.9	414.0	227.9	101.7	8,618.8
				PROJECTIONS					
1995	713.4	1,202.8	2,296.7	2,288.1	1,725.5	437.0	224.5	113.1	9,001.0
1996	711.2	1,170.9	2,313.9	2,332.6	1,800.5	451.5	225.6	115.6	9,121.8
1997	711.2	1,138.7	2,337.1	2,376.8	1,867.3	465.9	231.0	117.5	9,245.4
1998	714.6	1,117.7	2,351.9	2,416.3	1,937.9	477.3	238.6	119.2	9,373.5
1999	717.7	1,103.9	2,363.0	2,451.8	1,994.6	497.6	247.3	120.9	9,496.9
2000	722.7	1,095.4	2,378.8	2,475.1	2,046.6	522.7	256.2	122.6	9,620.0
2001	722.4	1,100.1	2,390.1	2,487.6	2,096.3	549.2	265.8	124.6	9,736.1
2002	720.9	1,107.5	2,399.9	2,499.3	2,124.1	588.1	275.3	126.7	9,841.7
2003	717.7	1,119.8	2,405.2	2,509.4	2,157.2	626.8	282.9	128.9	9,948.0
2004	716.1	1,131.0	2,403.7	2,523.7	2,191.7	654.3	295.7	131.3	10,047.5
2005	715.8	1,145.1	2,391.8	2,537.7	2,236.4	676.1	311.1	133.7	10,147.6
2006	717.1	1,151.1	2,371.5	2,557.1	2,280.8	696.9	327.6	136.5	10,238.6
2007	716.6	1,155.1	2,352.7	2,581.8	2,324.5	699.8	351.4	139.4	10,321.2
2008	720.6	1,156.5	2,349.0	2,596.7	2,363.0	705.2	374.9	142.1	10,408.0
2009	722.0	1,160.2	2,351.3	2,606.2	2,397.1	712.2	391.8	145.8	10,486.7
2010	721.1	1,166.2	2,361.0	2,619.5	2,419.0	722.0	405.2	149.9	10,563.8
2011	719.3	1,174.5	2,375.7	2,628.2	2,430.3	731.4	418.0	154.6	10,631.9

TABLE 5. LABOUR FORCE BY AGE — MALES SERIES D
ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
('000)

	Age Group								
Year	*15-19*	*20-24*	*25-34*	*35-44*	*45-54*	*55-59*	*60-64*	*65 and over*	*Total*
				ANNUAL AVERAGES					
1978	413.2	539.8	1,095.1	807.7	723.2	287.8	167.5	69.7	4,103.9
1979	422.6	555.6	1,115.6	826.9	712.7	293.6	152.4	66.9	4,146.5
1980	428.6	572.7	1,138.0	851.8	705.2	301.9	146.2	66.8	4,211.2
1981	429.2	589.0	1,163.1	884.7	698.9	300.0	147.9	65.9	4,278.9
1982	421.8	596.1	1,178.1	932.4	698.4	298.1	146.9	60.9	4,332.8
1983	401.8	603.2	1,192.2	976.2	700.4	295.0	143.2	59.7	4,371.6
1984	398.6	600.3	1,196.1	1,014.6	709.7	298.5	147.7	61.4	4,426.9
1985	402.3	601.8	1,203.6	1,051.1	713.6	296.7	151.0	62.2	4,482.3
1986	420.9	600.1	1,229.2	1,088.8	729.6	295.9	159.6	62.0	4,586.1
1987	423.9	593.5	1,254.8	1,121.9	741.3	288.0	163.1	65.5	4,652.0
1988	427.8	596.4	1,278.7	1,160.6	758.2	278.3	174.4	70.1	4,744.5
1989	441.9	595.9	1,301.1	1,179.5	791.5	279.1	181.7	71.8	4,842.5
1990	435.3	605.9	1,311.9	1,213.2	830.4	275.5	186.0	74.3	4,932.5
1991	394.8	611.3	1,316.5	1,229.4	861.1	271.4	182.8	74.9	4,942.2
1992	377.7	625.5	1,307.2	1,233.1	896.3	274.0	178.9	79.3	4,971.9
1993	364.3	629.1	1,301.1	1,241.3	936.1	275.3	173.1	74.3	4,994.6
				PROJECTIONS					
1995	368.7	647.7	1,322.0	1,277.2	1,005.5	292.0	170.0	83.8	5,167.0
1996	367.8	630.2	1,325.4	1,294.8	1,040.0	299.8	170.5	85.7	5,214.2
1997	367.7	612.5	1,333.5	1,312.5	1,069.4	307.6	174.0	87.3	5,264.4
1998	369.7	600.6	1,338.2	1,328.6	1,100.5	313.1	179.2	88.6	5,318.6
1999	371.4	592.8	1,341.5	1,343.7	1,123.6	324.0	185.3	90.0	5,372.3
2000	373.8	588.3	1,348.4	1,352.1	1,144.4	337.3	191.8	91.3	5,427.4
2001	373.9	590.8	1,353.0	1,354.8	1,164.5	351.7	198.5	92.9	5,480.2
2002	373.7	594.1	1,356.8	1,358.0	1,172.3	373.6	205.2	94.6	5,528.3
2003	372.3	600.6	1,357.7	1,361.4	1,183.2	395.0	210.3	96.4	5,576.8
2004	372.0	606.2	1,355.2	1,367.1	1,195.5	408.9	219.1	98.4	5,622.4
2005	372.8	612.8	1,346.9	1,372.8	1,214.5	419.1	229.4	100.3	5,668.7
2006	374.0	615.9	1,334.1	1,382.4	1,234.0	428.1	240.7	102.6	5,711.6
2007	374.3	618.2	1,321.1	1,395.5	1,253.2	426.1	257.1	104.9	5,750.5
2008	377.1	618.8	1,316.8	1,404.0	1,270.2	425.4	273.2	107.1	5,792.7
2009	378.6	621.0	1,315.6	1,409.5	1,285.9	425.8	284.2	110.1	5,830.7
2010	378.7	625.3	1,318.3	1,417.7	1,294.6	428.1	292.8	113.3	5,868.7
2011	378.6	630.0	1,324.4	1,423.2	1,298.0	431.0	300.5	117.0	5,902.7

TABLE 6. LABOUR FORCE BY AGE — FEMALES SERIES D
ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
('000)

	Age Group								
Year	*15-19*	*20-24*	*25-34*	*35-44*	*45-54*	*55-59*	*60-64*	*65 and over*	*Total*
					ANNUAL AVERAGES				
1978	375.0	409.5	576.7	457.5	352.6	106.3	40.0	21.9	2,339.5
1979	375.2	422.7	588.8	475.8	350.8	101.2	38.8	19.1	2,372.6
1980	392.5	443.3	619.8	502.0	352.5	107.1	41.3	23.1	2,481.7
1981	384.6	451.9	643.4	522.3	361.0	109.6	37.2	21.4	2,531.5
1982	376.5	464.0	656.0	556.3	363.3	104.1	36.5	20.5	2,577.0
1983	374.2	475.9	671.2	579.5	357.4	107.1	40.9	19.6	2,625.8
1984	371.7	483.1	691.7	611.1	379.2	109.1	41.9	20.4	2,708.1
1985	377.6	489.4	735.1	661.5	385.5	105.5	43.2	20.2	2,818.0
1986	398.9	493.2	787.4	723.3	417.8	111.5	46.4	23.1	3,001.6
1987	401.3	495.8	823.0	760.8	435.5	115.1	48.2	25.9	3,105.6
1988	402.3	496.9	852.8	819.3	464.9	115.5	51.1	27.2	3,230.0
1989	412.6	511.7	894.7	867.3	502.8	118.0	54.8	23.4	3,385.4
1990	404.3	525.0	918.3	918.4	537.4	121.9	59.4	26.3	3,511.1
1991	369.9	532.1	926.6	928.7	577.1	129.2	56.1	28.1	3,547.9
1992	359.2	536.5	928.0	937.7	618.6	131.6	52.3	26.1	3,590.2
1993	341.2	539.9	922.9	938.4	660.8	138.7	54.9	27.4	3,624.2
					PROJECTIONS				
1995	344.8	555.5	975.9	1,011.6	720.2	145.0	54.5	29.3	3,836.8
1996	343.9	541.8	992.2	1,040.0	761.2	151.8	55.2	29.9	3,916.0
1997	344.6	528.3	1,011.0	1,068.6	799.3	158.6	57.2	30.3	3,997.9
1998	346.6	520.5	1,026.1	1,095.2	839.7	164.8	59.7	30.7	4,083.3
1999	348.9	516.1	1,040.1	1,119.8	874.6	174.4	62.4	31.1	4,167.4
2000	352.5	513.9	1,055.7	1,139.8	907.2	186.4	65.0	31.4	4,251.9
2001	353.2	517.9	1,069.4	1,155.2	938.6	198.8	68.0	31.9	4,333.0
2002	353.0	523.7	1,082.0	1,170.0	960.6	216.1	71.0	32.3	4,408.7
2003	352.4	531.1	1,092.7	1,183.5	985.1	233.8	73.7	32.8	4,485.1
2004	352.4	538.4	1,099.3	1,199.3	1,009.7	247.8	77.8	33.3	4,558.0
2005	352.5	547.6	1,100.9	1,215.2	1,038.3	259.7	83.1	33.8	4,631.1
2006	353.9	552.3	1,098.3	1,232.9	1,066.4	272.0	88.5	34.4	4,698.8
2007	354.5	555.7	1,096.9	1,252.5	1,094.6	277.3	96.1	35.0	4,762.7
2008	357.0	558.5	1,101.7	1,267.1	1,120.2	283.9	103.7	35.6	4,827.6
2009	358.4	561.9	1,109.1	1,279.1	1,143.3	291.1	109.7	36.5	4,889.1
2010	358.8	565.7	1,119.8	1,292.0	1,161.4	299.3	114.8	37.4	4,949.3
2011	358.7	571.4	1,132.2	1,302.7	1,174.8	306.5	120.2	38.4	5,005.0

TABLE 7. LABOUR FORCE BY AGE — PERSONS SERIES D
ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
('000)

	Age Group								
Year	*15-19*	*20-24*	*25-34*	*35-44*	*45-54*	*55-59*	*60-64*	*65 and over*	*Total*
				ANNUAL AVERAGES					
1978	788.3	949.3	1,671.8	1,265.2	1,075.8	394.1	207.4	91.6	6,443.4
1979	797.9	978.3	1,704.4	1,302.7	1,063.5	394.9	191.2	86.1	6,519.0
1980	821.2	1,015.9	1,757.9	1,353.8	1,057.8	408.9	187.5	89.9	6,692.9
1981	813.8	1,040.9	1,806.5	1,407.0	1,060.0	409.7	185.1	87.3	6,810.3
1982	798.3	1,060.1	1,834.1	1,488.7	1,061.7	402.1	183.4	81.5	6,909.8
1983	776.0	1,079.0	1,863.4	1,555.7	1,057.8	402.1	184.1	79.3	6,997.4
1984	770.3	1,083.5	1,887.8	1,625.7	1,088.9	407.6	189.6	81.7	7,135.1
1985	779.9	1,091.2	1,938.7	1,712.6	1,099.1	402.2	194.2	82.4	7,300.3
1986	819.8	1,093.3	2,016.6	1,812.1	1,147.4	407.4	206.0	85.0	7,587.6
1987	825.2	1,089.2	2,077.7	1,882.7	1,176.8	403.1	211.3	91.5	7,757.6
1988	830.1	1,093.4	2,131.5	1,979.9	1,223.1	393.8	225.5	97.3	7,974.5
1989	854.5	1,107.6	2,195.8	2,046.8	1,294.3	397.1	236.4	95.2	8,227.9
1990	839.6	1,131.0	2,230.2	2,131.6	1,367.8	397.5	245.4	100.6	8,443.7
1991	764.7	1,143.4	2,243.1	2,158.1	1,438.2	400.6	238.9	103.0	8,490.1
1992	736.9	1,162.0	2,235.2	2,170.8	1,514.9	405.6	231.2	105.4	8,562.0
1993	705.6	1,169.0	2,223.9	2,179.7	1,596.9	414.0	227.9	101.7	8,618.8
				PROJECTIONS					
1995	713.5	1,203.2	2,297.9	2,288.8	1,725.7	437.0	224.5	113.1	9,003.8
1996	711.7	1,172.0	2,317.6	2,334.7	1,801.2	451.6	225.7	115.7	9,130.2
1997	712.3	1,140.8	2,344.6	2,381.1	1,868.7	466.2	231.2	117.6	9,262.3
1998	716.3	1,121.1	2,364.4	2,423.8	1,940.2	477.9	238.9	119.3	9,401.8
1999	720.3	1,108.9	2,381.6	2,463.5	1,998.1	498.4	247.8	121.1	9,539.7
2000	726.3	1,102.2	2,404.1	2,491.8	2,051.6	523.7	256.8	122.8	9,679.3
2001	727.2	1,108.6	2,422.4	2,510.0	2,103.1	550.5	266.5	124.8	9,813.2
2002	726.7	1,117.8	2,438.8	2,528.0	2,132.8	589.8	276.2	126.9	9,937.0
2003	724.7	1,131.7	2,450.3	2,544.8	2,168.2	628.8	284.0	129.2	10,061.9
2004	724.3	1,144.6	2,454.5	2,566.4	2,205.2	656.6	296.9	131.7	10,180.4
2005	725.3	1,160.4	2,447.8	2,588.0	2,252.8	678.8	312.5	134.1	10,299.8
2006	727.9	1,168.2	2,432.4	2,615.3	2,300.4	700.1	329.1	137.0	10,410.4
2007	728.8	1,173.9	2,418.0	2,648.1	2,347.8	703.4	353.1	140.0	10,513.1
2008	734.1	1,177.2	2,418.5	2,671.1	2,390.4	709.3	376.9	142.7	10,620.3
2009	737.0	1,182.9	2,424.7	2,688.6	2,429.1	716.9	393.9	146.6	10,719.8
2010	737.6	1,191.0	2,438.2	2,709.7	2,456.0	727.3	407.6	150.7	10,818.0
2011	737.3	1,201.4	2,456.6	2,725.9	2,472.8	737.5	420.7	155.5	10,907.7

TABLE 8. PARTICIPATION RATES BY SEX, AUSTRALIA — SERIES A and D
ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
(Per cent)

ANNUAL AVERAGES

Year	*Males*	*Females*	*Persons*
1978	78.8	43.7	61.0
1979	78.4	43.6	60.8
1980	78.3	44.8	61.3
1981	78.0	44.7	61.1
1982	77.4	44.6	60.8
1983	76.7	44.7	60.4
1984	76.3	45.3	60.6
1985	75.8	46.3	60.8
1986	75.9	48.3	61.9
1987	75.3	48.9	62.0
1988	75.2	49.9	62.4
1989	75.4	51.2	63.2
1990	75.6	52.2	63.7
1991	74.7	52.0	63.2
1992	74.2	51.9	62.9
1993	73.7	51.8	62.6

PROJECTIONS

	Series A			*Series D*		
June	*Males*	*Females*	*Persons*	*Males*	*Females*	*Persons*
1995	73.9	53.6	63.6	73.9	53.6	63.6
1996	73.7	54.0	63.7	73.7	54.0	63.7
1997	73.5	54.4	63.8	73.5	54.4	63.9
1998	73.3	54.8	63.9	73.3	54.9	64.0
1999	73.0	55.2	64.0	73.1	55.3	64.1
2000	72.8	55.5	64.1	72.9	55.6	64.1
2001	72.5	55.8	64.1	72.6	55.9	64.2
2002	72.2	56.1	64.0	72.3	56.2	64.1
2003	72.0	56.3	64.0	72.1	56.4	64.1
2004	71.6	56.5	63.9	71.8	56.6	64.1
2005	71.3	56.6	63.9	71.5	56.8	64.0
2006	71.0	56.7	63.7	71.1	56.9	63.9
2007	70.6	56.8	63.6	70.8	57.0	63.8
2008	70.3	56.8	63.5	70.5	57.1	63.7
2009	69.9	56.8	63.3	70.1	57.1	63.5
2010	69.5	56.8	63.1	69.8	57.1	63.4
2011	69.2	56.8	62.9	69.4	57.1	63.2

TABLE 9. PARTICIPATION RATES BY AGE — MALES
ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
(Per cent)

Year	Age Group							
	15-19	*20-24*	*25-34*	*35-44*	*45-54*	*55-59*	*60-64*	*65 and over*
ANNUAL AVERAGES								
1978	62.9	90.5	96.2	96.1	92.0	83.2	59.3	12.5
1979	64.1	90.9	96.2	95.9	91.6	82.1	54.4	11.6
1980	65.3	91.5	95.9	95.6	91.5	82.6	51.5	11.2
1981	66.0	91.6	95.5	95.5	90.9	81.2	50.5	10.7
1982	65.0	90.9	95.6	95.1	90.7	80.1	48.1	9.7
1983	61.9	91.0	95.5	95.0	90.7	78.5	44.9	9.3
1984	61.2	90.1	95.3	94.9	90.6	78.0	44.1	9.3
1985	60.8	90.3	94.6	94.7	89.9	77.1	43.8	9.1
1986	61.7	90.6	94.9	94.6	90.1	77.0	45.4	8.7
1987	60.4	90.2	94.9	94.3	89.2	75.8	45.9	8.9
1988	60.0	90.6	94.6	94.4	88.6	74.3	48.5	9.2
1989	61.9	89.9	94.6	93.8	89.1	75.2	49.8	9.1
1990	61.4	89.8	94.4	94.4	89.9	75.0	50.6	9.2
1991	57.1	88.4	94.5	94.1	89.6	73.7	49.9	8.9
1992	56.0	88.2	93.8	93.7	88.9	73.2	49.5	9.2
1993	55.1	87.5	93.5	93.6	89.0	71.7	48.7	8.4
PROJECTIONS								
1995	56.7	88.4	93.6	93.5	88.7	71.5	48.9	9.0
1996	56.4	88.3	93.5	93.4	88.6	71.0	48.9	9.0
1997	56.0	88.1	93.4	93.3	88.5	70.5	48.9	9.0
1998	55.7	88.0	93.2	93.2	88.5	70.1	48.9	9.0
1999	55.3	87.8	93.1	93.1	88.4	69.7	48.9	9.0
2000	55.0	87.7	93.0	93.0	88.3	69.3	48.9	9.0
2001	54.7	87.6	92.9	92.9	88.3	68.9	48.9	9.0
2002	54.3	87.5	92.7	92.9	88.2	68.5	48.9	9.0
2003	54.0	87.3	92.6	92.8	88.2	68.1	48.9	9.0
2004	53.7	87.2	92.5	92.7	88.1	67.8	48.9	9.0
2005	53.4	87.1	92.4	92.6	88.1	67.5	48.9	9.0
2006	53.1	87.0	92.3	92.6	88.0	67.1	48.9	9.0
2007	52.8	86.9	92.2	92.5	88.0	66.8	48.9	9.0
2008	52.5	86.8	92.1	92.5	88.0	66.5	48.9	9.0
2009	52.1	86.7	92.0	92.4	87.9	66.2	48.9	9.0
2010	51.8	86.6	91.9	92.3	87.9	65.9	48.9	9.0
2011	51.5	86.5	91.8	92.3	87.9	65.7	48.9	9.0

TABLE 10. PARTICIPATION RATES BY AGE — FEMALES
ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
(Per cent)

	Age Group							
Year	*15-19*	*20-24*	*25-34*	*35-44*	*45-54*	*55-59*	*60-64*	*65 and over*
				ANNUAL AVERAGES				
1978	58.9	68.6	51.1	56.6	46.9	30.1	13.1	2.8
1979	58.6	69.3	51.0	57.2	47.1	27.8	12.8	2.4
1980	61.5	71.0	52.4	58.2	47.7	28.9	13.4	2.8
1981	60.5	70.5	53.1	58.2	49.0	29.5	11.6	2.5
1982	59.6	70.9	53.4	58.5	49.3	28.0	11.0	2.4
1983	59.5	71.9	53.9	58.1	48.3	28.7	11.9	2.2
1984	59.0	73.0	55.0	59.1	50.7	29.1	11.7	2.2
1985	59.1	74.2	57.5	61.4	50.9	28.2	11.9	2.1
1986	60.6	75.4	60.6	64.6	54.2	30.1	12.6	2.4
1987	59.3	76.4	62.0	65.4	55.1	31.4	13.1	2.6
1988	58.5	76.7	63.0	67.9	57.0	31.9	13.8	2.6
1989	59.9	77.9	64.7	69.8	59.4	32.7	14.8	2.2
1990	59.3	78.6	65.7	72.0	61.0	33.9	16.0	2.4
1991	55.8	77.5	65.9	71.3	62.8	35.9	15.2	2.5
1992	55.7	76.5	65.9	71.1	64.1	35.9	14.4	2.3
1993	54.1	76.2	65.6	70.4	65.5	36.9	15.3	2.3
				PROJECTIONS				
1995	56.1	78.9	69.1	73.8	65.8	36.6	15.5	2.4
1996	55.8	79.2	70.0	74.6	66.9	37.2	15.8	2.4
1997	55.5	79.4	70.9	75.4	67.9	37.8	16.0	2.4
1998	55.2	79.7	71.7	76.2	68.8	38.4	16.2	2.4
1999	54.9	79.9	72.4	77.0	69.8	38.9	16.5	2.4
2000	54.6	80.1	73.2	77.7	70.7	39.5	16.7	2.4
2001	54.3	80.4	73.9	78.4	71.5	40.1	16.9	2.4
2002	54.0	80.5	74.5	79.1	72.4	40.7	17.2	2.4
2003	53.7	80.7	75.2	79.7	73.2	41.2	17.4	2.4
2004	53.5	80.9	75.8	80.3	73.9	41.8	17.7	2.4
2005	53.2	81.0	76.4	80.9	74.7	42.4	17.9	2.4
2006	52.9	81.1	76.9	81.4	75.4	43.0	18.1	2.4
2007	52.6	81.3	77.4	82.0	76.1	43.5	18.4	2.4
2008	52.3	81.4	77.9	82.5	76.7	44.1	18.6	2.4
2009	52.0	81.5	78.4	82.9	77.3	44.7	18.8	2.4
2010	51.7	81.6	78.8	83.4	77.9	45.3	19.1	2.4
2011	51.4	81.7	79.3	83.8	78.4	45.8	19.3	2.4

TABLE 11. PARTICIPATION RATES BY AGE — PERSONS SERIES A ANNUAL AVERAGES 1978 TO 1993 AND PROJECTIONS 1995 TO 2011
(Per cent)

	Age Group							
Year	*15-19*	*20-24*	*25-34*	*35-44*	*45-54*	*55-59*	*60-64*	*65 and over*
				ANNUAL AVERAGES				
1978	60.9	79.5	73.7	76.7	70.0	56.4	35.3	6.9
1979	61.4	80.1	73.6	76.9	69.8	54.7	32.7	6.3
1980	63.4	81.2	74.2	77.2	70.1	55.6	31.6	6.4
1981	63.3	81.1	74.4	77.1	70.4	55.3	30.1	6.0
1982	62.4	80.9	74.5	77.0	70.4	54.1	28.8	5.4
1983	60.7	81.5	74.7	76.8	69.9	53.7	27.8	5.2
1984	60.1	81.5	75.1	77.3	71.1	53.9	27.4	5.2
1985	59.9	82.3	76.0	78.3	70.8	53.0	27.4	5.1
1986	61.1	83.1	77.7	79.8	72.6	54.0	28.7	5.1
1987	59.9	83.3	78.4	80.0	72.6	54.0	29.2	5.2
1988	59.2	83.7	78.8	81.3	73.2	53.4	31.0	5.4
1989	60.9	84.0	79.6	81.9	74.6	54.3	32.2	5.2
1990	60.4	84.2	80.0	83.3	75.8	54.7	33.3	5.3
1991	56.4	83.0	80.1	82.7	76.5	55.0	32.5	5.3
1992	55.9	82.4	79.8	82.4	76.8	54.8	31.9	5.3
1993	54.6	81.9	79.5	82.0	77.5	54.5	32.0	4.9
				PROJECTIONS				
1995	56.4	83.7	81.4	83.6	77.5	54.3	32.1	5.3
1996	56.1	83.8	81.8	84.0	77.9	54.4	32.3	5.3
1997	55.7	83.9	82.1	84.3	78.3	54.5	32.4	5.3
1998	55.4	83.9	82.5	84.7	78.7	54.5	32.5	5.3
1999	55.1	84.0	82.8	85.0	79.1	54.6	32.7	5.3
2000	54.8	84.0	83.1	85.3	79.5	54.6	32.9	5.3
2001	54.5	84.1	83.4	85.6	79.9	54.7	33.0	5.3
2002	54.2	84.1	83.7	85.9	80.3	54.8	33.2	5.3
2003	53.9	84.1	84.0	86.2	80.7	54.8	33.3	5.3
2004	53.6	84.1	84.2	86.5	81.0	54.9	33.4	5.3
2005	53.3	84.1	84.4	86.7	81.3	55.0	33.5	5.3
2006	53.0	84.1	84.7	87.0	81.7	55.1	33.6	5.3
2007	52.7	84.1	84.9	87.2	82.0	55.2	33.7	5.3
2008	52.4	84.1	85.1	87.4	82.3	55.3	33.8	5.3
2009	52.1	84.1	85.2	87.6	82.6	55.4	33.8	5.3
2010	51.8	84.1	85.4	87.8	82.9	55.5	33.9	5.4
2011	51.5	84.1	85.6	88.0	83.1	55.7	34.0	5.4

EXPLANATORY NOTES

Introduction

This publication contains estimates of the civilian labour force and participation rates for Australia, derived from the Labour Force Survey for the period 1978-1993, and projections of the labour force and participation rates for Australia for the period 1995-2011.

Objectives

2. Labour force projections included in this publication are not intended to be predictions or forecasts. They are illustrations of growth and change in the age-sex structure of the labour force if certain stated demographic, social and economic assumptions apply over the projection period.

3. While the assumptions for the projections are formulated on the basis of an objective assessment of past demographic, social and economic trends both in Australia and overseas (and their likely future dynamics), there is no certainty that any of the assumptions will be realised.

4. This publication contains two series of labour force projections, corresponding to the Series A and D of the current ABS population projections (see Technical Notes, paragraph 7). Users may choose to select a particular series according to their assessments of the corresponding population projections, that is, whether they are considered to be high or low.

Methodology

5. The methodology used to develop the projections included in this publication is outlined in the Technical Notes.

Annual averages

6. Estimates of the labour force for the period up to 1993 are presented as annual (calendar year) averages of original estimates. Corresponding participation rates were compiled by dividing the annual average labour force estimate by the annual (calendar year) average of the civilian population.

Participation rates for persons

7. Projected participation rates for persons included in Table 11 were calculated by adding the male and female projected labour force for each age group and dividing this by the projected total civilian population for the same age group. While Table 11 shows participation rates for persons according to the Series A population projections, rates derived under the Series D population projections would be the same except for minor differences (of the order of 0.1 percentage points) in the rates for persons in the 25-34 and 45-54 years age groups.

Floppy disk service

8. The data contained in this publication can also be obtained on floppy disk. Inquiries should be made to Don Clark on (06) 252 6018 or any ABS office.

Related publications

9. Other ABS publications which may be of interest include:

The Labour Force, Australia (6203.0) — issued monthly

Projections of the Populations of Australia, States and Territories, 1993 to 2041 (3222.0)

Information Paper: A Guide to Smoothing Time Series — Estimates of 'Trend' (1316.0)

Information Paper: Time Series Decomposition — An Overview (1317.0)

Information Paper: Measuring Employment and Unemployment (6279.0)

Information Paper: A Guide to Interpreting Time Series — Monitoring 'Trends' An overview (1348.0)

10. Current publications produced by the ABS are listed in the *Catalogue of Publications and Products, Australia* (1101.0). The ABS also issues, on Tuesdays and Fridays, a *Publications Advice* (1105.0) which lists publications to be released in the next few days. The Catalogue and Publications Advice are available from any ABS office.

11. Estimates have been rounded and discrepancies may occur between sums of the component items and totals.

TECHNICAL NOTES

Introduction

The size of the labour force is determined by two major factors: i) the size and age-sex structure of the population and ii) labour force participation rates. Both these factors have been considered in the development of the projections included in this publication.

Methodology

2. The first stage in the method used for the preliminary projections was to project participation rates by applying simple regressions over time. Because of the strong seasonality present, monthly seasonally adjusted estimates of labour force participation rates from 1978 to 1993 were chosen for the extrapolation rather than original or smoothed seasonally adjusted participation rate series (see Appendix, paragraph 8).

3. Ordinary least squares regression was applied to derive a linear trend line for the participation rates for each age-sex group (graphs of the results are included in the Appendix). Each group was then assessed individually against a number of pre-determined criteria to ensure that the resultant projections were meaningful. These criteria included the assumptions that:

- for the span of the projection period, Australia would be experiencing economic growth, which on average would be similar to that experienced in the past 15 years;
- the participation rate for females would not exceed that for males for any age group; and
- the ratio between the participation rates of consecutive age groups should be relatively stable (or explicable, as in the case of the 15-19 and 20-24 age groups).

4. Further judgemental considerations were applied in cases where the trend line did not reflect more recent estimates for a particular age-sex group. The basis of these assumptions is discussed in paragraphs 18 to 26 of the Appendix.

5. Once the projected participation rates were settled, they were applied to the population projections to give labour force projections. Graphs of the final results are included in the Appendix.

6. Users interested in more detail on the methodology should refer to the Appendix.

Population projections

7. In May 1994, the ABS published population projections under the various sets of assumptions described below. Series A and D provide alternative minimum and maximum projected populations for Australia, incorporating different assumptions of net overseas migration gains.

PROJECTION SERIES

Series		Assumptions
A		Mortality
	(M)	Fertility I
	(L)	Overseas migration I
D		Mortality
	(M)	Fertility I
	(H)	Overseas migration II

Note - (L): Low Level (M): Medium Level (H): High Level

8. For this publication the projected participation rates have been applied to the Series A and D population projections.

9. From these sets of population projections, adjustments were made to account for the number of defence force personnel, thus making the projections consistent with the population covered by the Labour Force Survey (i.e. civilian rather than total population). The assumption used in making this adjustment is that the proportion of the population in the defence forces (by age group as at January 1994) will remain constant throughout the projection period.

10. Assumptions relating to mortality, migration and fertility are embodied in the population projections, and any interpretation of the resulting labour force projections should take these into account.

11. More details on the assumptions which comprise these series and the population projections techniques can be found in Sections 2 and 3 of *Projections of the Populations of Australia, States and Territories, 1993 to 2041* (3222.0).

GLOSSARY

Employed: Persons aged 15 and over who, during the reference week:

(a) worked for one hour or more for pay, profit, commission or payment in kind in a job or business, or on a farm (comprising employees, employers and self-employed persons); or

(b) worked for one hour or more without pay in a family business or on a farm (i.e. unpaid family helpers); or

(c) were employees who had a job but were not at work and were: on paid leave; on leave without pay for less than four weeks up to the end of the reference week; stood down without pay because of bad weather or plant breakdown at their place of employment for less than four weeks up to the end of the reference week; on strike or locked out; on workers' compensation and expected to be returning to their job; or receiving wages or salary while undertaking full-time study; or

(d) were employers, self-employed persons or unpaid family helpers who had a job, business or farm, but were not at work.

Labour force: For any group, persons who were employed or unemployed, as defined.

Participation rate: For any group, the labour force (i.e. the employed and the unemployed as defined) expressed as a proportion of the population in the same group.

Seasonally adjusted series: Seasonal adjustment is a means of removing the estimated effects of normal seasonal variation from the series so that the effects of other influences on the series can be more clearly recognised. Seasonal adjustment does not remove the irregular or non-seasonal influences which may be present in any particular month.

Trend series: A smoothed seasonally adjusted series of estimates. Users may wish to refer to the ABS Information Papers *A Guide to Smoothing Time Series — Estimates of 'Trend'* (1316.0), and *Time Series Decomposition — An Overview* (1317.0) for more detailed information on producing trend estimates by smoothing seasonally adjusted time series data.

Unemployed: Persons aged 15 and over who were not employed during the reference week, and:

(a) had actively looked for full-time or part-time work at any time in the four weeks up to the end of the reference week and:

(i) were available for work in the reference week, or would have been available except for temporary illness (i.e. lasting for less than four weeks to the end of the reference week); or

(ii) were waiting to start a new job within four weeks from the end of the reference week and would have started in the reference week if the job had been available then; or

(b) were waiting to be called back to a full-time or part-time job from which they had been stood down without pay for less than four weeks up to the end of the reference week (including the whole of the reference week) for reasons other than bad weather or plant breakdown.

APPENDIX

LABOUR FORCE PROJECTIONS, AUSTRALIA: METHODOLOGY

Introduction

The ABS first published labour force projections in 1991. These projections covered the period 1992 to 2005 and relied almost exclusively upon simple time-trend regression techniques to project participation rates. The projected participation rates were then combined with the population projections published in *Projections of the Populations of Australia, States and Territories, 1989 to 2031* (3222.0) to construct estimates of the labour force for 16 age-sex groups.

2. The population projections related to June 1989 estimated resident population, based on 1986 Census data. With the publication of revised population projections and labour force estimates derived from the 1991 Census, a similar approach has been adopted for the latest labour force projections, which extend to the year 2011. While the precise techniques have been modified, the time-trend regression methodology is still the preferred approach.

3. The previous edition of this bulletin contained a discussion of the development of labour force projections in the ABS. Issues surrounding the use of econometric modelling versus univariate time series techniques to project participation rates were explored. The discussion concluded that univariate time series techniques represented the most appropriate approach for the ABS at that time.

4. The key arguments supporting this conclusion included the cost effectiveness of the univariate techniques and the failure of econometric models to produce significantly superior results. These arguments were supported in a paper by Dunlop et al (1982) and by an examination of studies in the United States Bureau of Labor Statistics and in the United Kingdom Department of Employment. As there is no contrary evidence to these arguments they have been accepted for the current projections.

5. The modifications employed in the construction of the current participation rate projections reflect a decision to allow the data to play a greater role in determining projection paths. Previously the participation rate in 2005 was pre-determined (largely on the basis of international comparisons) for several cohorts. For these projections an attempt has been made to allow the data to determine the end-points and curvature of the projections, while still constraining the projections to fall within a certain range. Nevertheless, it is important to recognise that these projections still represent only one of many possible scenarios.

6. Any inquiries regarding the methodology used in constructing these projections should be directed to Steven Kennedy, Econometric and Time Series Analyses Section, ABS, Canberra, on (06) 252 6617.

Participation rates

7. Monthly participation rates for 16 age-sex groups over the period 1978 to 1993 were selected for analysis. Despite the existence of equivalent quarterly time series dating back to the mid-1960s, the monthly data were considered more suitable for two reasons:

- the longer term institutional developments which have significantly influenced the growth in female participation rates did not emerge until the late 1970s. The earlier data may therefore contain little relevant information for the purpose of producing projections;
- the data contained in the quarterly time series are not average rates calculated for the quarter, but rather the monthly rates pertaining to the mid-months of the quarters (February, May, August and November). Participation rates display strong seasonality, and consequently different choices of the representative month for the quarter (first month/mid-month/final month) can result in significantly different levels of the derived time series. This is not satisfactory for the purposes of the required analysis.

8. Because of the strong seasonality present, especially in the younger age groups, seasonally adjusted participation rates were chosen for the analysis rather than original (unadjusted) estimates. Despite the presence of a significant irregular component in some (especially older) age groups, it was decided not to use smoothed seasonally adjusted (trend) estimates in the analysis. This decision was taken primarily because of:

- concern about the interaction between the smoothing methodology and the regression techniques proposed for forming the projections, in particular, in reducing the standard error on the parameter estimates described in paragraphs 11 to 14 below; and
- uncertainty about the impact of the asymmetric filters used to determine the curvature of the data in the most recent periods.

Methodology

9. Three basic methods were used to project participation rates for the various cohorts:

- *constant participation rates*: assuming that the participation rate will remain at a constant level for future periods;
- *linear trends*: which involves fitting a linear trend to the participation rates, using the ordinary least squares (OLS) regression technique, and then extrapolating the estimated linear trend; and

- *logistic trends*: which involves fitting a logistic trend to the participation rates, using a non-linear least squares methodology, and extrapolating the fitted trend. In some instances male and female rates for the same age cohort have been modelled simultaneously, applying a restriction which forces the two trends to converge to a common rate.

10. *Constant Rates*. Assuming a constant rate in future periods is perhaps the simplest technique for extrapolating participation rates. The constant rate is set to the average participation rate calculated over the most recent time period, usually the last five to ten years. This technique is most suitable for either very stable participation rates, or for cases where the data are highly irregular and no sensible trend can be readily detected.

11. *Linear Trends*. Linear trend extrapolation involves fitting the regression equation

$$p_t = \alpha + \beta T + \varepsilon_t$$

where p_t is the participation rate in time period t;
T is a linear time trend;
ε_t is the residual in time period t; and
α,β are the parameters to be estimated;

by Ordinary Least Squares (OLS) methods.

12. The estimated parameters from this regression are then used to extrapolate into the future. Linear trends are commonly used to extrapolate participation rates which are well behaved and only gradually declining or increasing over time. Clearly linear trends cannot be extrapolated indefinitely, since participation rates are bounded above and below by 100 per cent and 0 per cent, respectively. It is important, therefore, that the participation rates at the end of the forecast period be plausible and explicable.

13. *Logistic Trends*. Logistic trend extrapolation involves fitting the regression equation

$$p_t = 1 / (\kappa + \alpha\beta^T) + \varepsilon_t$$

where p_t is the participation rate in time period t;
T is a linear time trend;
ε_t is the residual in time period t; and
α,β,κ are the parameters to be estimated;

by Non-Linear Least Squares (NLLS) methods. It can be seen from the equation that, provided $\beta < 1.0$,

$$p_t \rightarrow 1/\kappa \text{ as } T \rightarrow \infty$$

14. That is, the logistic trend converges asymptotically to the value $1/\kappa$. The logistic regression may be fitted to either increasing or decreasing data, and is particularly suitable for data which:

- display indications of tapering growth rates; and/or
- are defined to lie within a specified range of values (for example, 0 to 1).

15. It may also happen that theoretical or empirical results suggest that the extrapolated trends should tend towards pre-determined maximum or minimum rates. In this instance, the appropriate value of k may be inserted in the equation, and there is then no need to estimate that parameter.

16. As foreshadowed above, the NLLS estimation technique may be adapted to allow simultaneous estimation of male and female participation rates within the same age group. If the two logistic trends are constrained to have a common value of k, then it can be seen that the extrapolated trends will converge to the same rate. This approach is useful in cases where the projected female participation rates would otherwise exceed the male rates within the time horizon of the projections.

17. For the earlier (1991) projections, several female age groups were modelled by an interpolation technique which linked the end-point of the actual data with a participation rate of 85 per cent at the end of the projected time horizon. By contrast, the logistic trend approach allows the data to play a greater role in determining the threshold participation rates and the pace of convergence to these rates.

Assessment of the methodology

Stages in assessing each age-sex group

18. For each age-sex group, the appropriate participation rate projection was determined in the following way.

19. OLS regression was used to fit a linear time trend to the data. If the extrapolated linear trend was found to be inappropriate (because of unusual cross-sectional features of the data, significant divergence from international experience or because it conflicted with generally accepted prior expectations), an alternative trend was derived. Depending on the characteristics of the data, either constancy assumptions were used, or a logistic time trend was fitted.

20. Examples of the generally accepted prior expectations referred to in the previous paragraph include:

- female participation rates should not exceed male participation rates for any given age group; and
- the ratio between the participation rates of consecutive age-sex groups should be relatively stable (or explicable, as in the case of the 15-19 and 20-24 age groups).

21. Statistical criteria were also used in the evaluation process, in particular, measures of the goodness of fit of the respective trend estimates were examined. Where the data indicated a period of significant stabilisation or an abrupt change of trend behaviour within the estimation period, attempts were also made to modify the trend estimates accordingly.

22. International comparisons (particularly with the United States and the United Kingdom) were also made to assess the final set of projections. While keeping in mind the difficulties of comparing projections pertaining to different labour markets with different institutional features, these comparisons lent consistent support to the projected changes in the composition of the Australian labour market.

23. Examination of the life-cycle profiles of labour force participation implied by the projections proved an effective means of checking that differences between consecutive age groups were reasonable and plausible. The life-cycle profiles also provide the means by which the full implications of the projections upon average life-time labour force participation can be assessed. Changes in the male and female life-cycle profiles are discussed further in Section 6.

Limitations of the Methodology

24. There are clearly many limitations to the present methodology employed to project participation rates. For this reason it is important to repeat the warning sounded in the previous publication, that is, *there is no rigorous and coherent theoretical background to the methodology chosen. Projections of participation rates only provide a scenario which might be realised if the necessarily arbitrary assumptions about those rates eventuate.*

25. Economic theory and widely accepted expectations of future movements in the Australian labour market have been considered in the evaluation of these projections. Supplementary modelling exercises were also conducted. For example, a second explanatory variable (deviations from the average unemployment rate) was introduced to explain short run movements in female participation rates. These exercises were conducted not as an alternative to the chosen methodology but as a part of the process of confirming the trend lines produced by the time-trend regression methods. Ultimately, however, it was the data which had the greatest influence in these projections, essentially making them atheoretical.

26. Critical examination of the final labour force projections should also recognise the assumptions underlying the population projections: see *Projections of the Populations of Australia, States and Territories 1993 to 2041* (3222.0).

Analysis by age group

27. As stated above, assessment of the participation rates for each age group began with an examination of the fitted linear trends. Comparisons were then made with the corresponding age group for the opposite sex, and with the contiguous age group for the same sex. Alternative formulations for the trend projections were then considered as required. Analysis of each age group follows.

15-19 year age group. The linear trend results for this age group showed male participation rates to be declining faster than female rates. Although the male rates have been historically higher than the female rates, the gap between the two rates is narrowing and they are now quite similar. The results suggest, therefore, that female participation rates will shortly exceed male rates, and that the difference will continue to grow until 2011. This scenario appears improbable.

28. The same phenomenon was observed when constructing the earlier (1991) projections. At that time, the decision was made to adjust the male participation rate trend projection. The average of the male/female sex ratio, calculated between August 1986 and August 1990, was multiplied by the projected female participation rates to give an alternative male participation rate trend. The result of this approach, when applied to the current data, is to stabilise the sex ratio at 1.03.

29. For the current projections, an alternative method of stabilising the sex ratio and adjusting the male trend has been used. Non-linear least squares estimation was used to fit the equation:

$$r_t = 1 / (1 + \alpha\beta^T) + \varepsilon_t$$

where r_t is the sex ratio in time period t;
T is a linear time trend;
ε_t is the residual in time period t; and
α,β are the parameters to be estimated;

to the sex ratio, thus constraining the ratio from falling below unity. The fitted values of the ratio are then multiplied by the female participation rate trend to produce a male trend projection that tapers over time to equal the female trend.

30. A number of factors have contributed to declining teenage labour force participation. Increased education retention is often cited as an important explanation for the decline. It should be noted, however, that increased education participation is likely to account only for a fall in full-time labour force participation. Part-time labour force participation may tend to increase with increases in education retention.

31. The recent accelerating decline in labour force participation may be attributable to the recent economic downturn. The question therefore arises as to whether participation rates will return to the levels prior to the economic downturn. The current trend line is slightly above the current level of participation, suggesting that teenage male and female participation rates may recover slightly in the short term before continuing the moderate rate of decline that is projected for the longer term. This teenage labour force scenario is broadly consistent with the one presented in the Department of Employment, Education and Training publication *Australia's Workforce in the Year 2001* (1991), where it is suggested that male rates will decline and female rates will remain stable.

20-24, 25-34, 35-44, and 45-54 year age groups. In all of these age groups, the steeply rising linear trend for female participation exceeds or nearly exceeds the slowly declining male linear trend within the projection horizon. It was decided, therefore, to fit logistic trends to the data, employing the simultaneous non-linear least squares methodology to estimate male and female trends simultaneously.

32. This method ensures that the male and female participation rate projections will converge, but not intersect, within the time horizon. In general the male logistic projections are only slightly higher than the male linear projections. However, the female logistic projections exhibit quite significant tapering relative to their linear counterparts. Thus most of the adjustment to a common limiting value seems to be borne by the female projections.

33. It is interesting to note that the strong increases in labour force participation observed over the last 15 years for all female groups show indications of tapering off. Some of the recent decline is likely to be the result of a reduction in employment opportunities due to the economic downturn. However, as the female participation rates approach international maxima as well as the corresponding male rates, the observed growth rates are likely to become less pronounced. The current projections are consistent with this expectation.

34. *55-59 year age group.* The linear trend was found to provide a satisfactory fit to the data for females. When the earlier (1991) projections were produced, it was found necessary to increase the slope of the fitted trend in order to stabilise the age group ratio (55-59 years old to 45-54 years old) at around 0.60. No adjustment was necessary this time since the resultant ratio was already stabilised at this level. The steeper linear trend in the current data has arisen because of continuing strong growth in the female participation rate over the last three years.

35. A logistic trend was fitted to the male participation rates for this age group, resulting in a more gradual decline than suggested by the linear approach. The logistic trend was preferred because of considerable doubt over the likelihood of a continuing strong decline in participation in this group. The superior statistical fit of the logistic trend supports this decision.

36. A number of influences may combine to determine future changes in male labour force participation for this age group. These include changes in the tax treatment of retirement income, discouraged worker effects, and structural and technological change in the workplace.

37. *60-64 year age group.* The dramatic decline in male participation rates in the early 1980s, which has subsequently been reversed, makes this a very difficult group for trend analysis. Much of the temporary decline can be attributed to increased entitlements to war service pensions.

38. For the 1991 projections of female participation rates, it was necessary to increase the linear trend in order to stabilise the ratio between the 60-64 year old and 55-59 age groups. However, as in the case with the previous group, this adjustment proved to be unnecessary for the current projections.

39. *65 and over age group.* As was the case in the 1991 projections, both the male and female participation rates for this age group are assumed to stabilise at a constant rate. The average participation rates calculated over the period August 1986 to February 1994 have been used. Linear regression results suggest declining trends for both males and females, although there is also evidence that the rates have stabilised in recent years. Therefore the constant rate assumption appears appropriate.

Life-cycle Features

40. Life-cycle profiles for males and females summarise the changes in labour force participation rates across all age groups. Life-cycle profiles can be presented in two ways: they can follow an individual age cohort (for example, all persons born in a given year) through time, or they can present a snapshot of all age groups at a particular point in time. Both presentations are useful for evaluating the implications of these projections for lifetime labour force participation. The following discussion focuses upon the second type of life-cycle profile.

41. Between 1978 and 1993, the profile of female labour force participation changed quite dramatically. Participation rates rose in all age groups, except the 15-19 year old group where there was a small decline. The largest increases were recorded in the 25-34, 35-44, and 45-54 year old groups resulting in a significant change in the female life-cycle profile. Historically the female profile has taken on an "M" shape as a result of females of females leaving the work force to have children and returning to the work force at a later time. The current projections reinforce the observed disappearance of the "M" profile, leading to a female life-cycle profile which is more similar to the male profile. This evolution has already been observed in other countries: in Sweden, for example, the female profile does not have an "M" shape.

42. In contrast, the male life-cycle profile has undergone very little change in recent times. Between 1978 to 1993, participation rates fell in all male age groups, with the most significant changes being in the 15-19 year old and 55-59 year old groups. The projections have tended to modify the falls in these age groups, resulting in a life-cycle profile in 2011 which is not unlike the 1993 profile. The greatest difference between the 1993 and 2011 male profiles is observed in the 55-59 year old group. Despite moderating the implied linear decline in participation rates for this group, the 2011 profile contains a small kink which must be attributed to a continuation of the move towards early retirement amongst males.

Comparison of the 1991 and 1994 Labour Force Projections

43. The two-stage methodology employed to produce labour force projections determines the need to examine variations to both participation rate projections and demographic projections when comparing the 1991 and 1994 labour force projections.

44. In 1991, the 'high' projected labour force for the year 2005 was 10.9 million. In 1994, the 'high' projected labour force for the year 2005 is 10.3 million, a reduction of 5.7 per cent. This decrease is the result of a lowering of the projected population and a reduction in projected participation rates. Approximately two-thirds of the reduction in the labour force figure may be attributed to the downward revision in population numbers and the remainder is due to modifications to the participation rate projections.

45. A full discussion of the population projections is included in *Projections of the Populations of Australia, States and Territories 1993 to 2041* (3222.0).

46. One notable change to the population projections concerns the interpretation of the Series A and Series D projections. In 1991, Series A assumed a continuation of the existing high levels of overseas migration, with Series D presenting an alternative low migration scenario.

However in the 1994 projections Series A reflects a continuation of the present low levels of net overseas migration, with Series D presenting an alternative based on higher levels of overseas migration. This change in the relative levels of the population projections should be recognised when comparing the 1991 and 1994 labour force projections.

47. Compared with the previous projections of participation rates, those now projected for females and persons are markedly lower. The age groups contributing most to the revision are females 25-34 years old and 35-44 years old. For these groups, the principal reason for the downward revision is the change in the projection methodology.

48. In 1991 it was anticipated, somewhat arbitrarily, that these age groups would have a participation rate of 85 per cent in 2005. The gap between the current participation rate and this pre-determined end-point was then interpolated, using a steadily declining growth rate. The current methodology simultaneously fits logistic trends to male and female participation rates, constraining both trends to converge to a common limiting rate. This approach lends support to the choice of 85 per cent as a plausible upper bound for the female participation rate, but suggests a slower rate of growth towards this limit.

49. This is seen most clearly in the case of females aged 25-34. In 1991 this group had a significantly lower rate of participation than females aged 20-24 and 35-44. The 1991 methodology therefore required that growth in the participation rate should be greater and more sustained for this group, in order to attain the target of 85 per cent in 2005. The current methodology, which is more strongly based upon the data, suggests that this required growth rate is unlikely to be achieved.

50. The change in methodology is effectively illustrated by the life-cycle profiles for the female labour force constructed from the two sets of projections. The female life-cycle of labour force participation in the early 1990s shows a characteristic "M" shape arising from the lower participation of females aged 25-34. The 1991 projections predicted that the "M" shape would completely disappear by 2005. The 1994 projections, while confirming this tendency, indicate a less dramatic change to the profile by 2005.

51. The use of logistic trends in preference to linear trends, and the simultaneous estimation of male and female trends within certain age groups, have resulted in male participation rate projections which are generally higher than those produced in 1991. However, because the historical data are so stable, the differences are very small.

52. The largest difference occurs in the 55-59 year old group, where the decision was made to replace the linear trend used in 1991 with a logistic trend. The tapering trend not only produces a better statistical fit to the data, but also is more consistent with recent conjecture that further declines in labour force participation by older males are unlikely (see, for example, the Committee on Employment Opportunities (1993)).

53. The 1991 projections were produced at the end of a period of strong employment growth. Between 1991 and 1994, participation rates generally fell, or their rates of growth moderated. It might be expected that the inclusion of the more recent data would therefore have a significant impact on projected average participation rates.

54. Clearly it is difficult to measure this effect due to the more substantial impact of the methodological changes. However, for the purpose of comparison, the present methodology was applied to the data truncated at August 1990. Some differences in trends were observed within particular age groups, most notably perhaps for persons 15-19 years old. Interestingly, some age groups experienced increases in participation in 1991-1994 which raised the 1994 trend projections - in particular, females 55-59 and 60-64 years old. Overall, however, the impact of the additional three years of data was minimal.

55. In conclusion, it is the revised treatment of the prime age female groups which represents the most substantial difference between the 1991 and 1994 projections. In most other respects, the 1994 projections confirm the judgement shown in the previous study.

Related publications

The Labour Force, Australia (6203.0)

Labour Force Projections, Australia, 1992-2005 (6260.0)

Retirement and Retirement Intentions, Australia (6238.0)

Participation in Education, Australia (6272.0)

Projections of the Populations of Australia, States and Territories 1993 to 2041 (3222.0)

Other publications and references

Anderson M. and Ross B. (1987), 'Labour Force Projections and Tables of Working Life: A Preliminary Investigation', *Paper to the 16th Conference of Economists*, August.

Committee on Employment Opportunities (1993) *Restoring Full Employment: A Discussion Paper.*

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Bureau of Labour Market Research: Dunlop Y., Healy T. & McMahon P.J. (1984) 'Australian Models of Labour Force Participation: A Critical Review', in *Labour Force Participation in Australia*, Kaspura A.J. (ed.), AGPS, Canberra.

New Zealand Department of Statistics (1974) *New Zealand Labour Force Projections, 1971-2001.*

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OECD (1987) *Employment Outlook*, September, OECD, Paris.

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United States Department of Labor, Bureau of Labor Statistics (1992) *BLS Handbook of Methods*, Government Printing Office, Washington, D.C.

United States Department of Labor, Bureau of Labor Statistics (1993) 'Another Look at the Labor Force', *Monthly Labor Review*, November.

PARTICIPATION RATES BY AGE AND SEX, SEASONALLY ADJUSTED AND PROJECTED, 1978 - 2011

The following graphs depict seasonally adjusted participation rates for each age-sex group and the linear regression values for the period February 1978 to August 1993, together with the monthly projected values up to June 2011. Care should be taken in comparing participation rates for different age groups, as data have been graphed using different scales.

Legend:

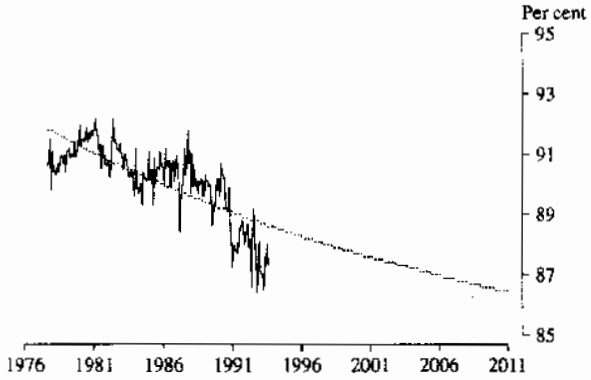
Seasonally adjusted estimates

Linear regression and projected values

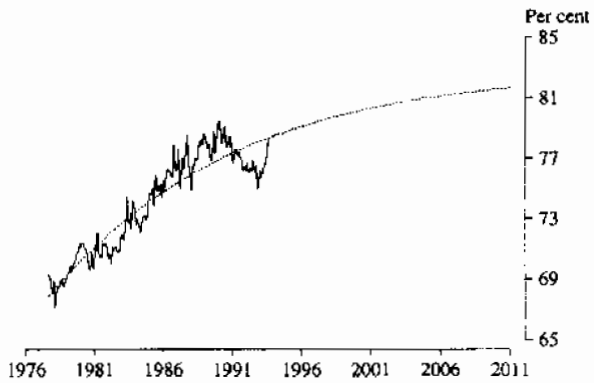
MALES 15-19 YEARS

FEMALES 15-19 YEARS

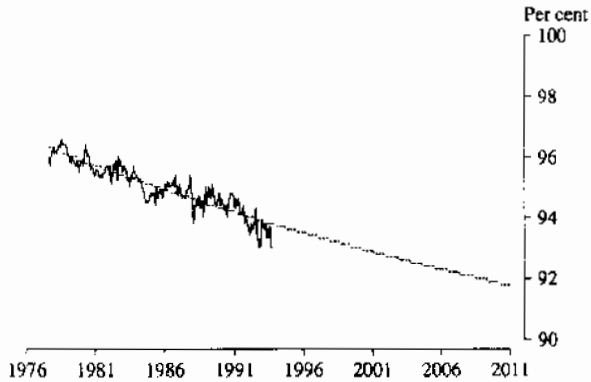
MALES 20-24 YEARS



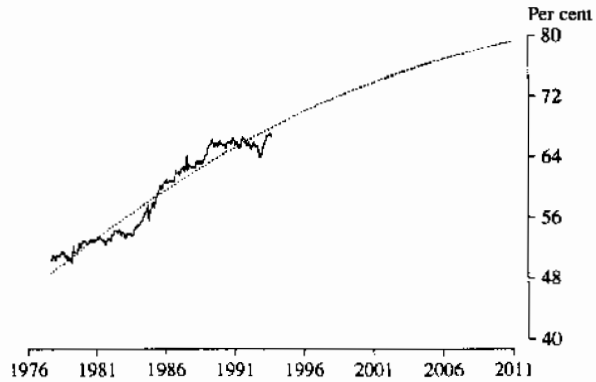
FEMALES 20-24 YEARS



MALES 25-34 YEARS



FEMALES 25-34 YEARS



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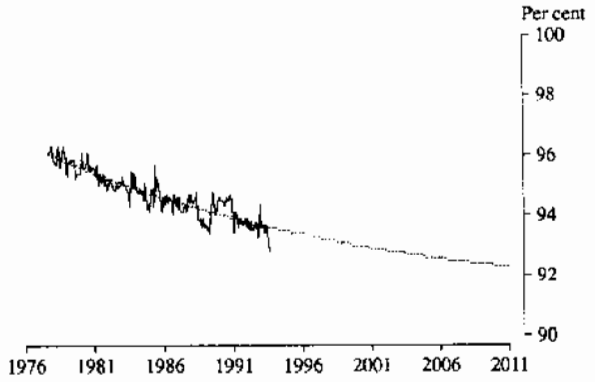
Legend:

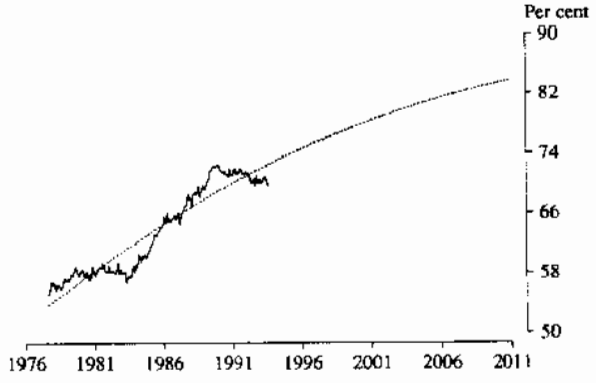
Seasonally adjusted estimates

Linear regression and projected values

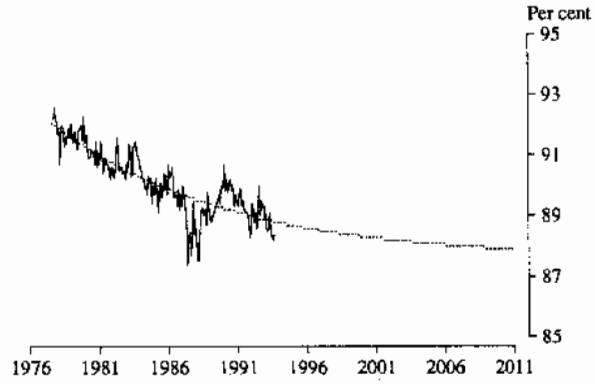
MALES 35-44 YEARS



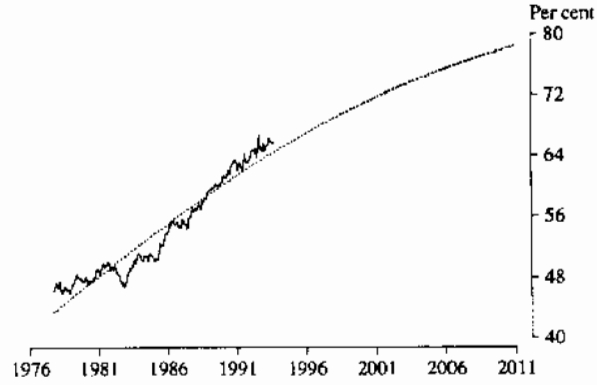
FEMALES 35-44 YEARS



MALES 45-54 YEARS

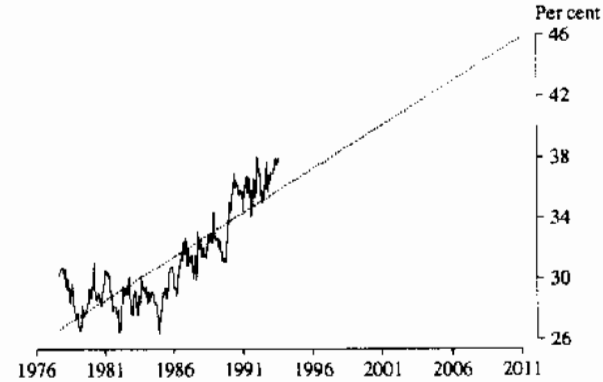


FEMALES 45-54 YEARS



MALES 55-59 YEARS

FEMALES 55-59 YEARS



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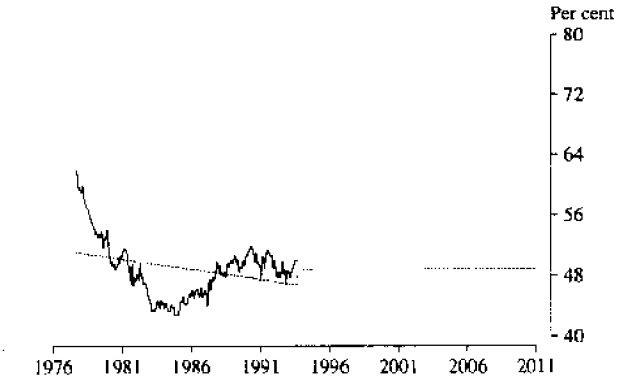
Legend:

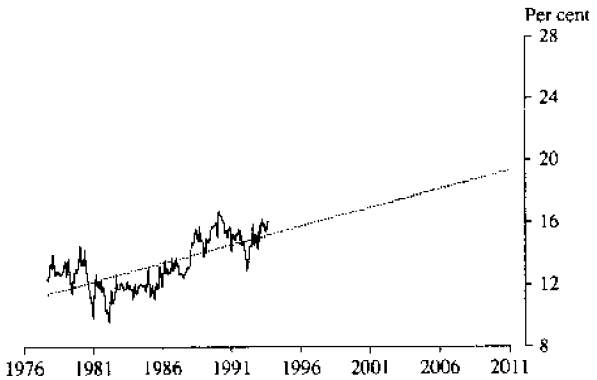
Seasonally adjusted estimates

Linear regression and projected values

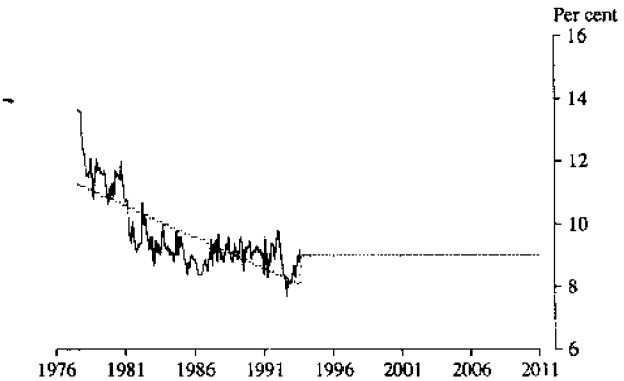
MALES 60-64 YEARS



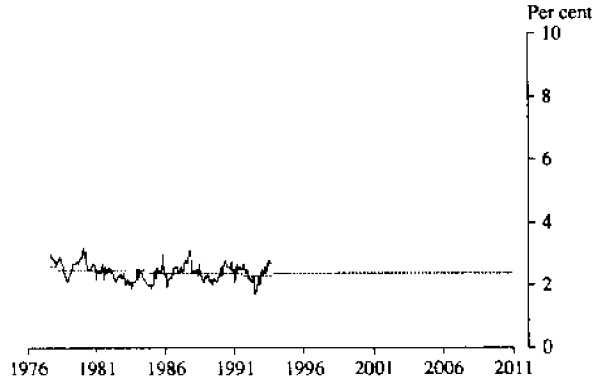
FEMALES 60-64 YEARS



MALES 65 YEARS AND OVER



FEMALES 65 YEARS AND OVER



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